27. (Amended) A method for improving performance in chemical mechanical polishing (CMP) applications, comprising the operations of:

providing a platen having piezoelectric elements of varying dimensions disposed therein, the platen being positioned below a polishing belt, wherein the piezoelectric elements are capable of exerting force on an underside of the polishing belt;

applying a wafer to the polishing belt;

stabilizing the polishing belt utilizing the platen, wherein the piezoelectric elements apply specific forces to the polishing belt; and

advancing a sacrificial material across the platen.

REMARKS

Claims 1, 8, 17, 21, 24, and 27 have been amended. Claims 1-28 are pending in the application. No new matter has been added.

Claims 1, 8, 17, 21, 24, and 27 have been amended to clarify that the piezoelectric elements are disposed within the platen and that the piezoelectric elements exert force on the underside of the polishing belt.

The Examiner has maintained her rejection of claims 1-7 under 35 U.S.C. § 102(a) as being anticipated by U.S. Patent No. 5,888,120 to Doran. Applicants respectfully traverse. Doran does not disclose or reasonably suggest each and every element of the invention as claimed by Applicants.

Independent claim 1 claims a platen, not a carrier head as disclosed in Doran. As set forth in claim 1, which has been amended to clarify that the claimed platen comprises a plurality of piezoelectric elements disposed within the platen, wherein the plurality of piezoelectric

elements is capable of exerting force on the underside of a polishing belt. As set forth in Applicant's previous response, Doran discloses a wafer carrier having a plurality of piezoelectric elements that exert force on a substrate. See Doran, Fig. 3, col. 4, lines 8-50. Doran does not disclose or reasonably suggest a platen having piezoelectric elements that are capable of exerting force on the underside of a polishing belt. Unlike the Doran carrier, which risks damaging the wafer when bending the wafer substrate, embodiments of the present invention do not risk damaging the wafer via substrate bending. More particularly, embodiments of the present invention exert force on a flexible polishing belt to shape the belt, rather than the wafer, to improve performance during the CMP process.

Accordingly, independent claim 1 is submitted to be patentable under 35 U.S.C. § 102(b) over the Doran patent. Claims 2-7, each of which ultimately depends from independent claim 1, are likewise submitted to be patentable under U.S.C. § 102(b) over the Doran patent for at least the same reasons set forth above regarding independent claim 1.

Claims 1-6, 8-14, 17, 19-23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,916,012 to Pant et al. (Pant) in view of U.S. Patent No. 5,888,120 to Doran. As will be fully explained below, the combination of the Pant and Doran references does not establish a *prima facie* case of obviousness against the subject matter defined in claims 1-6, 8-14, 17, 19-23.

Pant discloses a platen that utilizes air to exert pressure below the polishing belt, but, as the Examiner has noted, Pant does not disclose the use of piezoelectric elements for exerting pressure on the polishing belt. Doran discloses a wafer carrier having piezoelectric elements that exert force on the substrate. See Doran, Fig. 3, col. 4, lines 8-50. Doran does not disclose or reasonably suggest a platen having piezoelectric elements that are capable of exerting force on a polishing belt.

Neither the Pant reference nor the Doran reference discloses a platen having piezoelectric elements disposed within the platen. Further, the combination of the Pant and Doran references does not achieve the claimed invention. As stated above, the Pant reference discloses a platen that utilizes air to exert pressure below the polishing belt. However, as stated in the present application, the piezoelectric elements of a platen of the embodiments of the present invention greatly reduce the amount of air needed during the CMP process. Page 6, lines 1-3. Moreover, a CMP process using the piezoelectric elements of the present invention is not as sensitive to conditions as conventional CMP processes utilizing air bearings, such as the Pant reference. Unlike air bearings, the force exerted by the piezoelectric elements of the embodiments of the present invention does not experience as great a variance as experienced by air bearings when the gap between the polishing pad and the platen varies. Thus, if the polishing pad is pushed toward the platen in one area, the force exerted on the polishing belt by other piezoelectric elements is not as affected as other areas would be when utilizing an air bearing. Page 6, lines 4-11.

Doran also does not teach utilizing piezoelectric elements on the platen to flex the polishing belt. As mentioned above, Doran discloses a wafer carrier having piezoelectric elements that exert force on the substrate, which risks damaging the wafer when bending the wafer substrate. Unlike Doran, embodiments of the present invention do not risk damaging the wafer via substrate bending.

Although the Examiner states that Doran is relied on to show piezoelectric elements can be utilized to exert force, it is not obvious under §103(a) to replace air slits on the platen disclosed in Pant with the wafer carrier piezoelectric elements disclosed in Doran. At the outset, the piezoelectric elements disclosed in the Doran reference are not present on a platen, as are the air slits of the Pant reference. Moreover, the wafer carrier piezoelectric elements of Doran are utilized for a completely different purpose than the Pant platen air slits. In particular, the

piezoelectric elements of the Doran reference are used to bend the wafer, which is completely different from shaping the polishing belt, as taught in Pant. As stated in the Pant reference: "the fluid pressure adjustments in the present invention are performed to compensate for the flexibility of the belt, the linear translation of the belt across the wafer surface and any other irregularities introduced." Thus, there is no suggestion to replace the Pant platen air slits with the wafer carrier piezoelectric elements of Doran by combining the references. Furthermore, the Doran reference teaches away from the use of air to compensate for non-uniformity as disclosed in Pant, as described below.

It is improper to combine references where the references teach away from their combination. In particular, the Doran reference states: "air-pressure can be applied "behind" the wafer to effectively bow the wafer outward from the wafer carrier surface. This action is performed in an attempt to compensate for polishing non-uniformity. The fundamental problem with this method is that air is compressible fluid and the resulting "bubble" of air behind the wafer cannot be contained....No back-pressure setting could be applied to completely compensate for the polish pad rebound effect." (Doran, col. 2, lines 44-53). The Doran reference specifically excludes the use of air to compensate for non-uniformity. Hence, the Doran reference teaches away from the combination of Pant and Doran. Furthermore, there is no suggestion in either Pant or Doran to replace fluid pressure with piezoelectric elements. In fact, the Pant reference specifically sets forth a preference for fluid pressure and teaches various methods for proper utilization of fluid pressure to enhance the CMP process.

Accordingly, independents claim 1 and 8 are submitted to be patentable under 35 U.S.C. § 103(a) over the Pant patent in view of the Doran patent. Claims 2-6 and 9-16, each of which ultimately depends from independent claims 1 and 8 respectively, are likewise submitted to be patentable under U.S.C. § 103(a) over the Pant patent in view of the Doran patent for at least the same reasons set forth above regarding independent claims 1 and 8.

Independent claims 17, 21, 24, and 27 are submitted to be patentable under 35 U.S.C. § 103(a) over Pant in view of Doran and Tietz for at least the same reasons as set forth above with respect to independent claims 1 and 8. Claims 18-20, 22-23, 25-26, and 28, each of which ultimately depends from independent claim 17, 21, 24, and 27, respectively, are likewise submitted to be patentable under U.S.C. § 103(a) over Pant in view of Doran and Tietz for at least the same reasons set forth above regarding independent claim 1 and 8.

In view of the foregoing, Applicants respectfully request reconsideration and reexamination of claims 1-28, and submit that these claims are in condition for allowance. Accordingly, a notice of allowance is respectfully requested. In the event a telephone conversation would expedite the prosecution of this application, the Examiner may reach the undersigned at **(408) 749-6900 x6920**. If any fees are due in connection with the filing of this paper, then the Commissioner is authorized to charge such fees to Deposit Account No. 50-0805 (Order No. LAM2P220C). A copy of the transmittal is enclosed for this purpose.

Respectfully submitted,
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of	Docket No. LAM2P220C
Kistler et al.	Group Art Unit: 3723
Application No. 09/747,844	Examiner: Morgan, E.
Filed: December 12, 2001	Date: February 27, 2003
For: PIEZOELECTRIC PLATEN DESIGN FOR IMPROVING PERFORMANCE IN CMP APPLICATIONS	

MARKED UP CLAIMS

1. (Amended) A platen for improving performance in chemical mechanical polishing (CMP) applications, comprising:

a plurality of piezoelectric elements disposed [above] in the platen, wherein the plurality of piezoelectric elements is capable of exerting force on an underside of a polishing belt.

8. (Twice Amended) A system for improving performance in chemical mechanical polishing (CMP) application, comprising:

a wafer head capable of carrying a wafer;

a polishing belt disposed below the wafer head; and

a platen having piezoelectric elements disposed therein, the platen being positioned below the polishing belt, wherein the piezoelectric elements are capable of exerting force on an underside of the polishing belt.

17. (Amended) A method for improving performance in chemical mechanical polishing (CMP) applications, comprising the operations of:

providing a platen having piezoelectric elements disposed therein, the platen being positioned below a polishing belt [disposed above the platen], wherein the piezoelectric elements are capable of exerting force on an underside of the polishing belt[.];

applying a wafer to the polishing belt; and

stabilizing the polishing belt utilizing the platen, wherein the piezoelectric elements apply specific forces to the polishing belt.

21. (Amended) A platen for improving performance in chemical mechanical polishing (CMP) applications, comprising:

a plurality of piezoelectric elements disposed [above] in the platen, wherein the plurality of piezoelectric elements is capable of exerting force on an underside of a polishing belt,

wherein each piezoelectric element of the plurality of piezoelectric elements can be individually activated to exert force against the polishing belt, and wherein each piezoelectric element of the plurality of piezoelectric elements can be individually activated to adjust force resistance against the polishing belt.

24. (Amended) A system for improving performance in chemical mechanical polishing (CMP) application, comprising:

a wafer head capable of carrying a wafer;

a polishing belt disposed below the wafer head;

a platen having piezoelectric elements disposed therein, the platen being positioned below the polishing belt, wherein the piezoelectric elements are capable of exerting force on an underside of the polishing belt, wherein each piezoelectric element can be individually activated to exert force against the polishing belt, and wherein each piezoelectric element can be individually activated to adjust force resistance against the polishing belt; and

a sacrificial material disposed above the platen, the sacrificial material being used to reduce wear on the platen, wherein the sacrificial material is slowly rolled across the platen during a CMP process.

27. (Amended) A method for improving performance in chemical mechanical polishing (CMP) applications, comprising the operations of:

providing a platen having piezoelectric elements of varying dimensions disposed therein, the platen being positioned below a polishing belt [disposed above the platen], wherein the piezoelectric elements are capable of exerting force on an underside of the polishing belt[.];

applying a wafer to the polishing belt;

stabilizing the polishing belt utilizing the platen, wherein the piezoelectric elements apply specific forces to the polishing belt; and

advancing a sacrificial material across the platen.